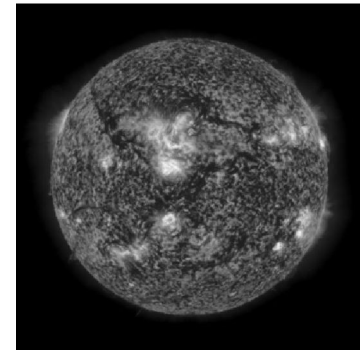


CALLISTO Receiver ~ Upgrades & Modifications ~

Whitham D. Reeve
Anchorage, Alaska USA



Society of Amateur Radio Astronomers
2012 SARA Western Regional Conference
Stanford, California
March 24-25, 2012



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1

Contents

- Review
- IF Output for SDR
- Up- or Down-Converters



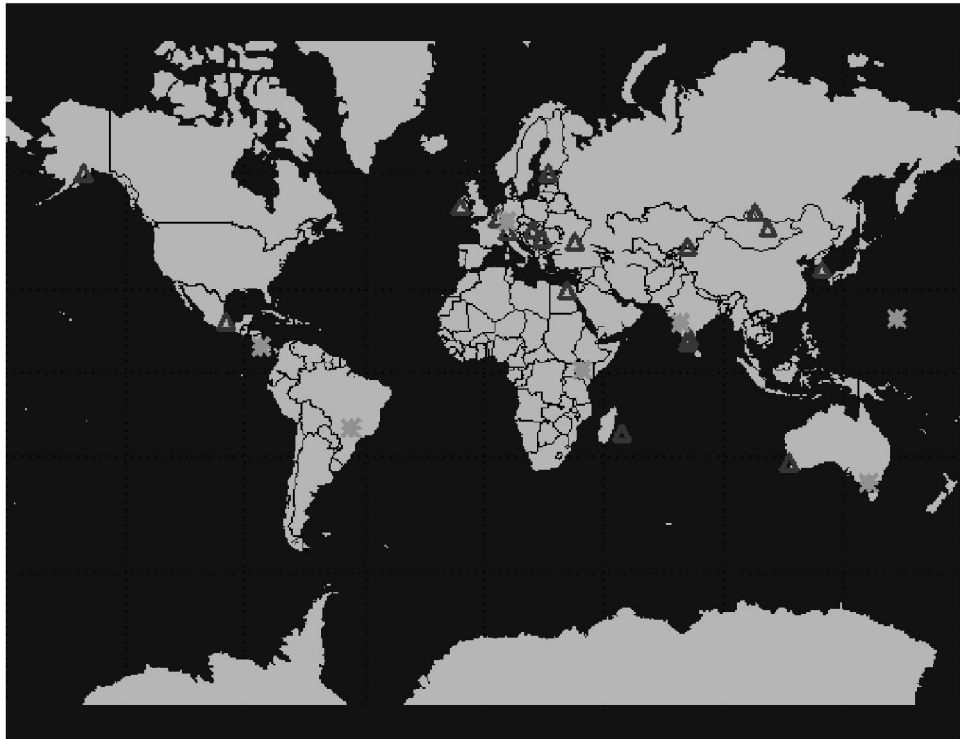
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2

CALLISTO Receiver Upgrades

- ◉ e-CALLISTO
Solar
Spectrometer
Network:
- ◉ extended-
Compound
Astronomical
Low-cost
Low-frequency
Instrument for
Spectroscopy and
Transportable
Observatory

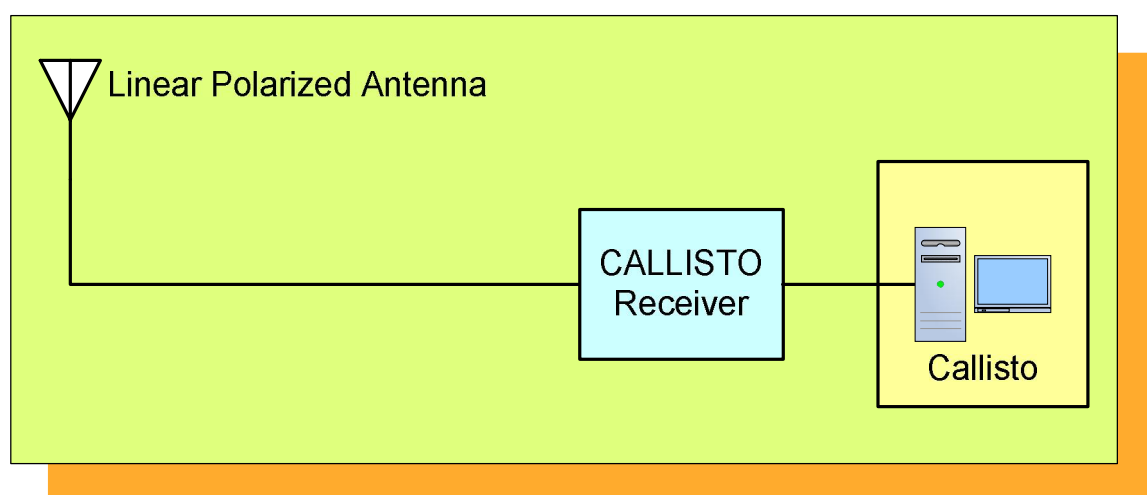


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3

CALLISTO Receiver Upgrades

- ◉ CALLISTO Receiver basic configuration

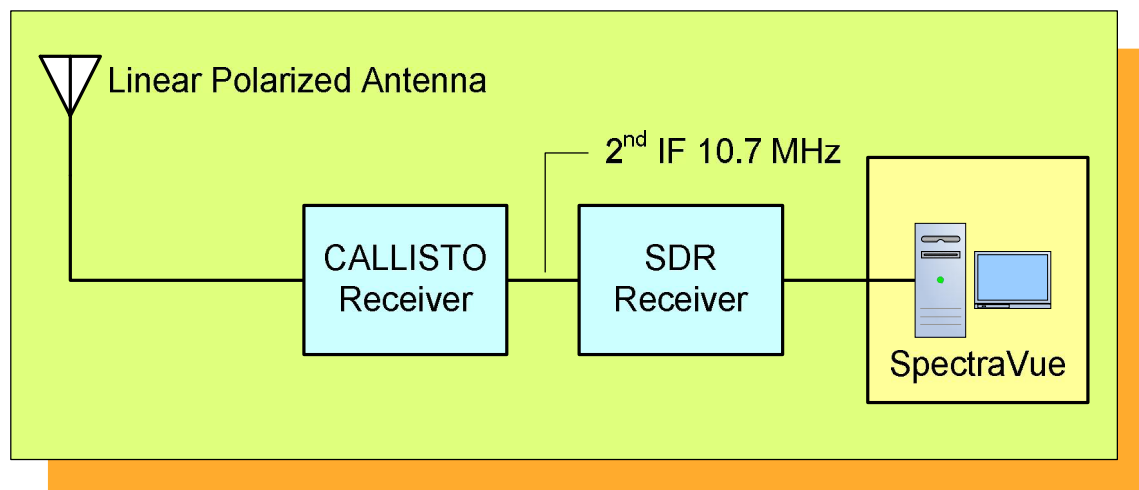


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4

CALLISTO Receiver Upgrades

- CALLISTO Receiver with Software Defined Radio

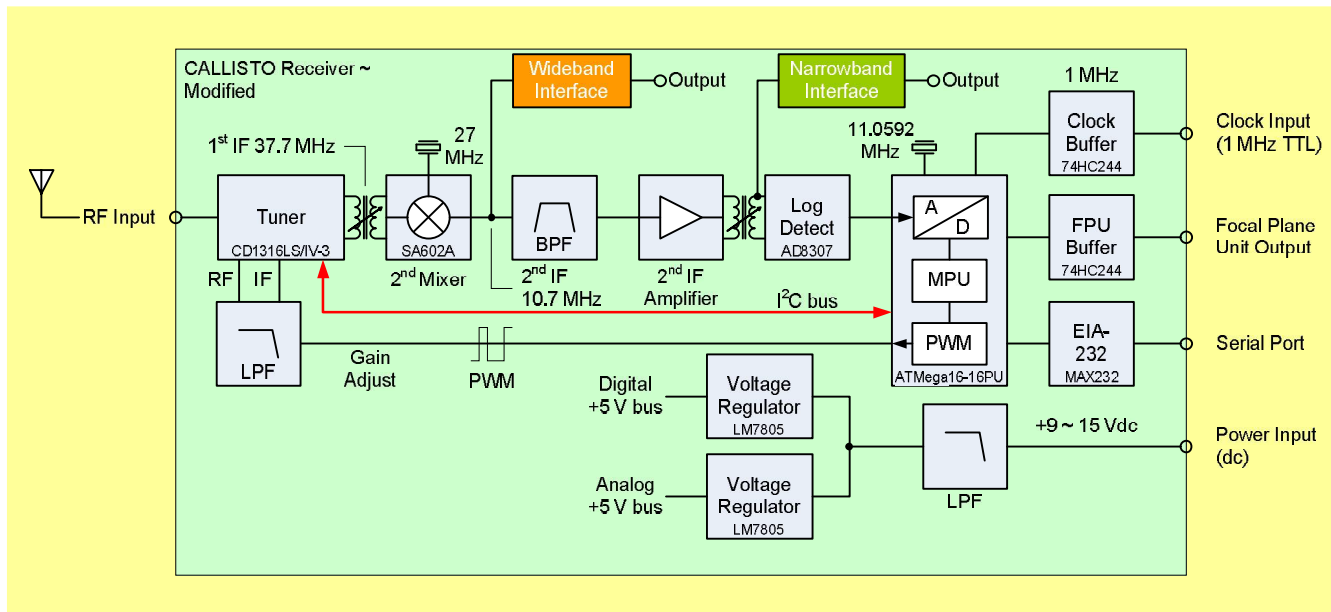


CALLISTO Receiver Upgrades

- Wideband Intermediate Frequency (IF) output to Software Defined Radio receiver
- Narrowband IF output to SDR receiver

CALLISTO Receiver Upgrades

Receiver Block Diagram ~ With Upgrades



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7

CALLISTO Receiver Upgrades

- Modified Receiver Ready for Use
- Rear View



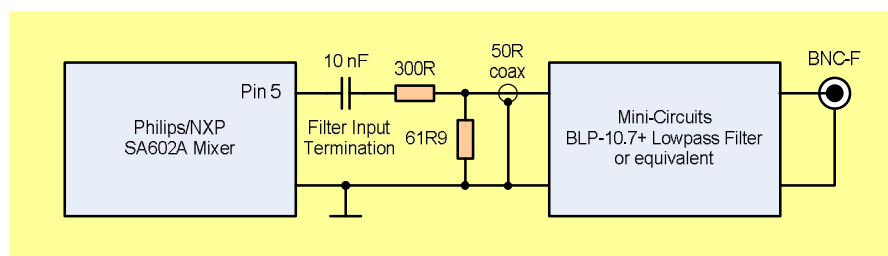
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8

CALLISTO Receiver Upgrades

Wideband IF output

- ☀ 10.7 MHz center frequency
- ☀ 6 MHz bandwidth
- ☀ Suitable for RFSpace SDR-14 and NetSDR or other wideband SDR



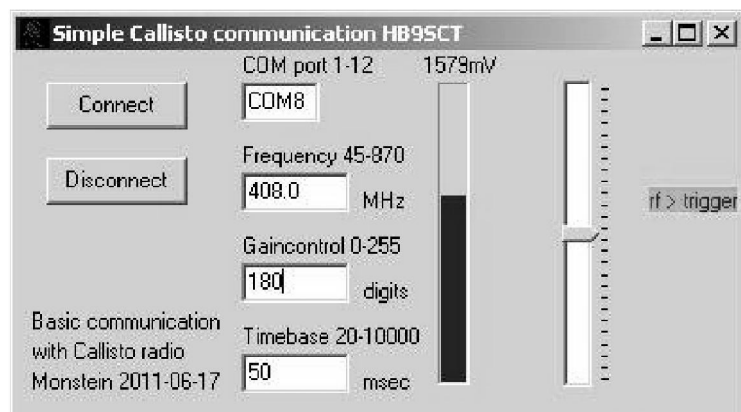
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9

CALLISTO Receiver Upgrades

Wideband IF output

- ☀ Receiver set to fixed frequency and gain adjusted using Simple software or HyperTerminal (or equivalent)



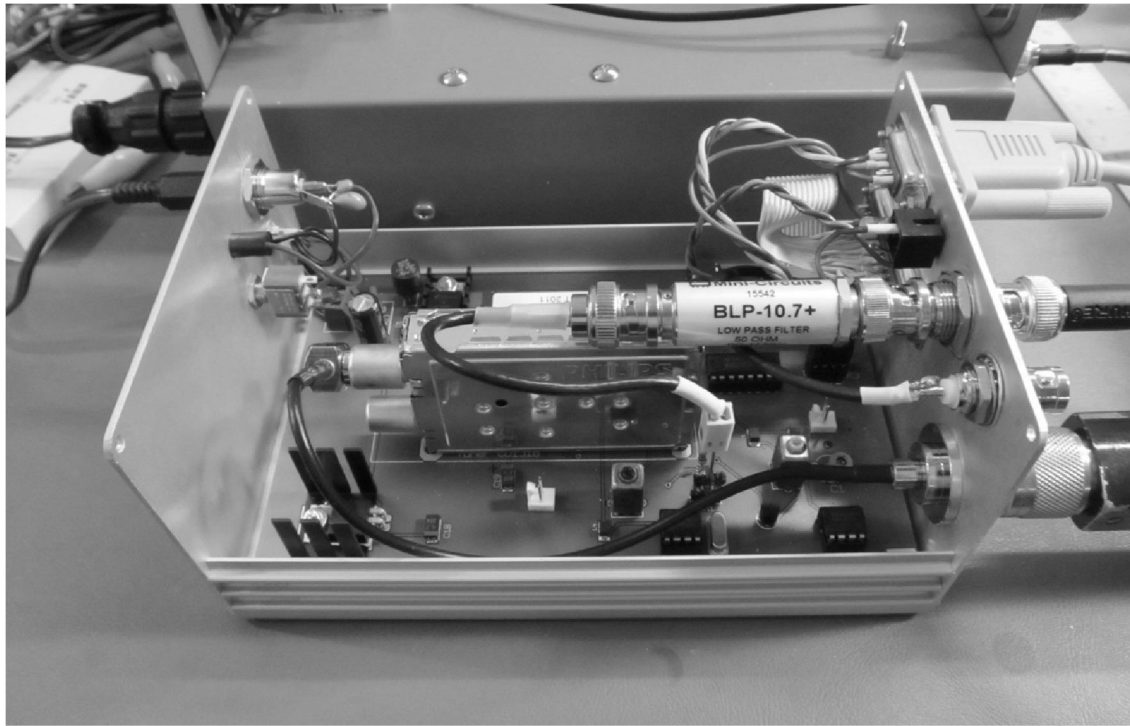
Simple software is our alignment and test tool

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10

CALLISTO Receiver Upgrades

- ◎ Wideband IF output

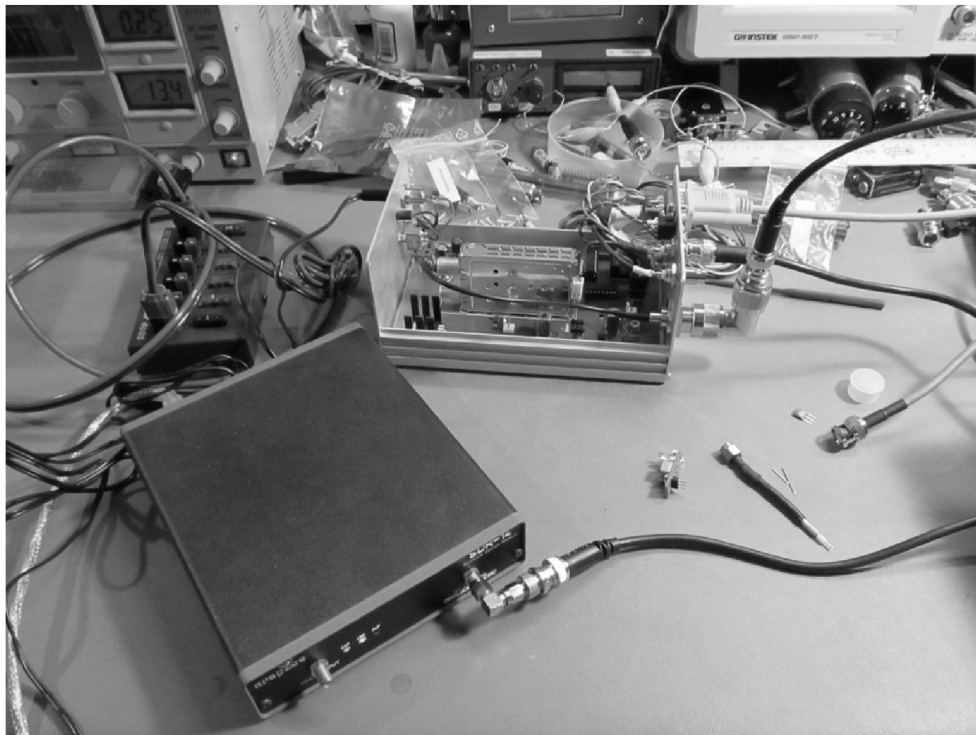


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11

CALLISTO Receiver Upgrades

- ◎ Wideband IF output to: SDR-14 receiver

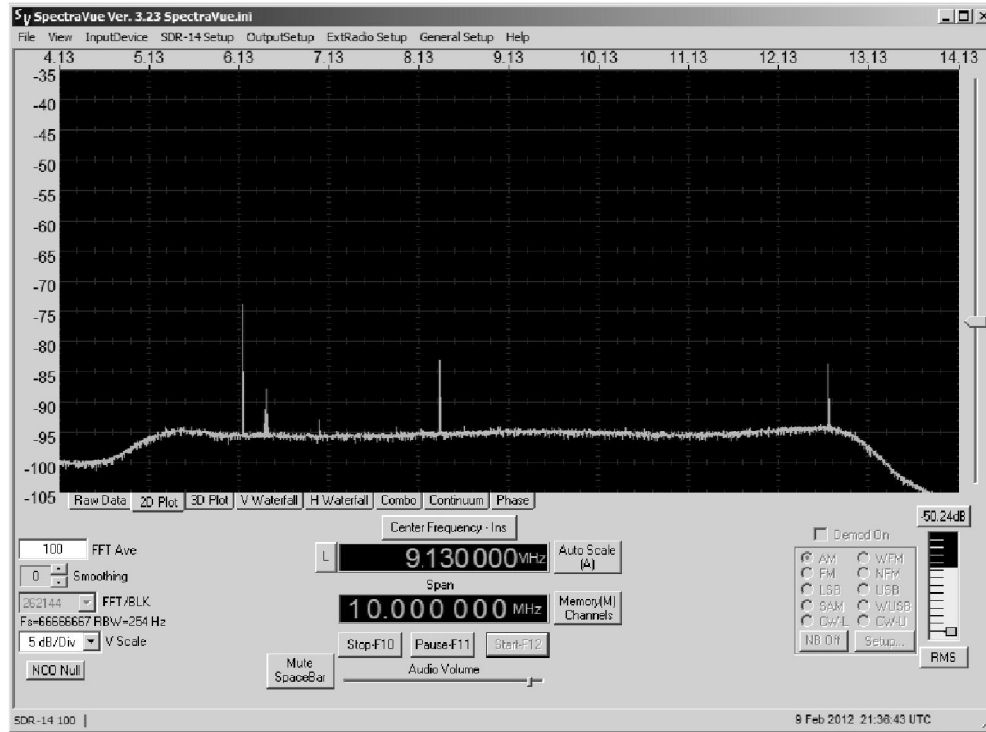


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12

CALLISTO Receiver Upgrades

- Wideband IF output

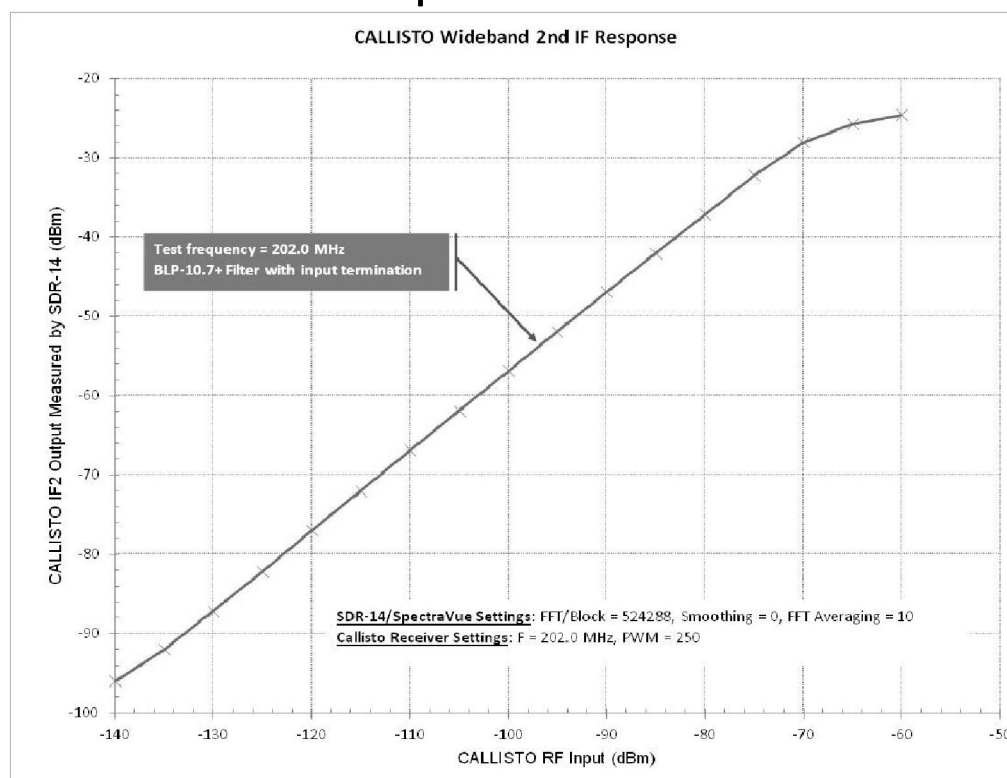


- SDR-14 with SpectraVue software
- 10 MHz bandwidth shown

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CALLISTO Receiver Upgrades

- Wideband IF output

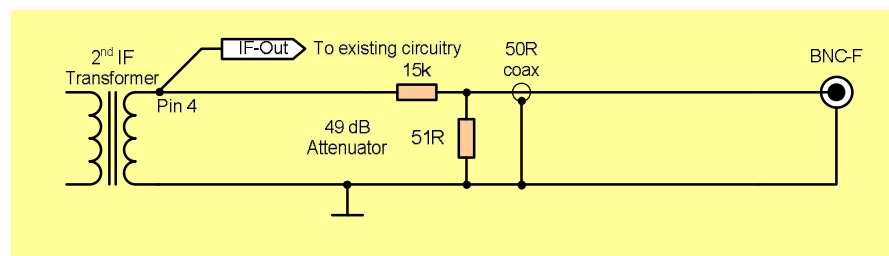


- Very linear over a wide range and very sensitive

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CALLISTO Receiver Upgrades

- ◉ Narrowband Intermediate Frequency (IF) output to Software Defined Radio receiver
 - ☀ 10.7 MHz center frequency
 - ☀ 300 kHz bandwidth
 - ☀ Suitable for RFSpace SDR-IQ or other narrowband SDR
 - ☀ Also works with SDR-14 and NetSDR or equivalent SDR

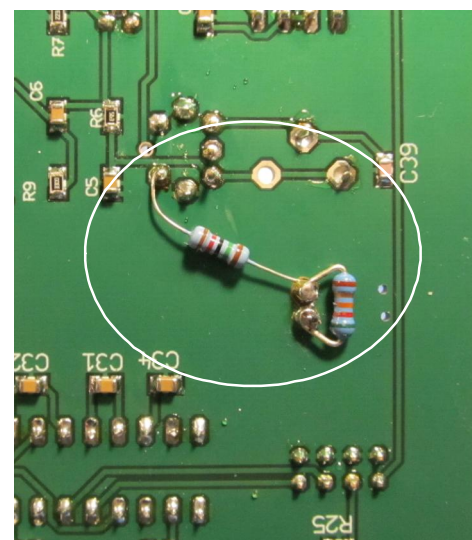
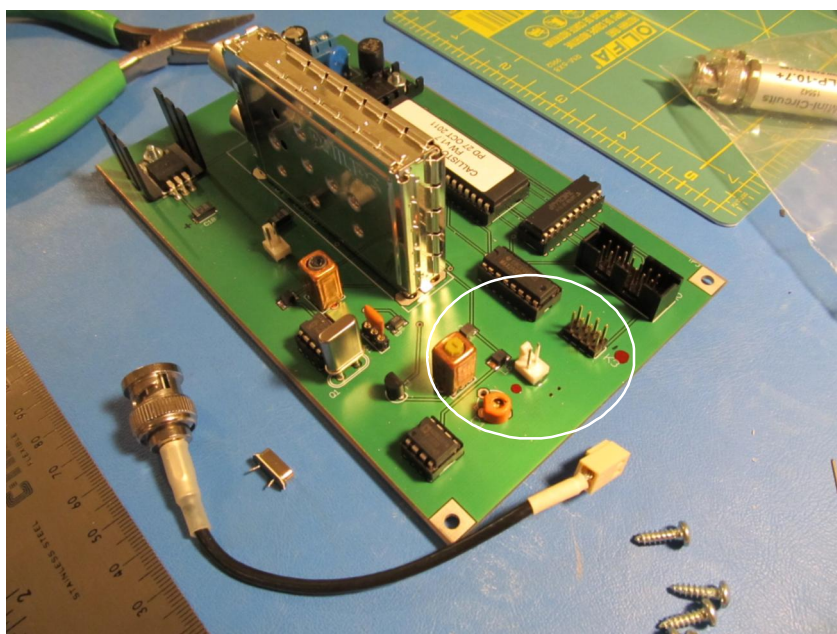


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15

CALLISTO Receiver Upgrades

- ◉ Narrowband IF Modification



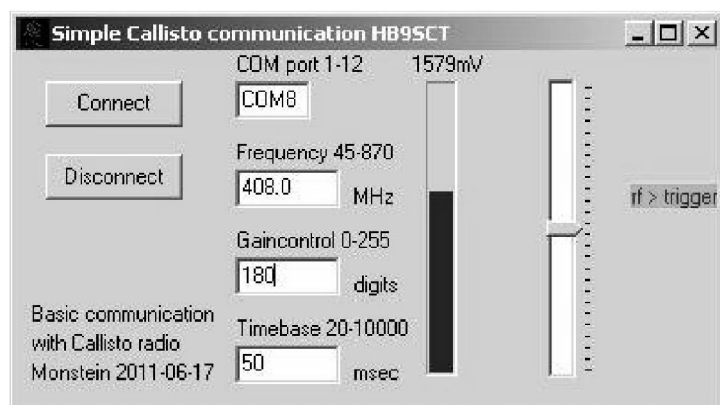
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16

CALLISTO Receiver Upgrades

☉ Narrowband IF output

- ☀ Receiver set to fixed frequency and gain adjusted using Simple software or HyperTerminal (or equivalent)
- ☀ Same software control setup as Wideband modification



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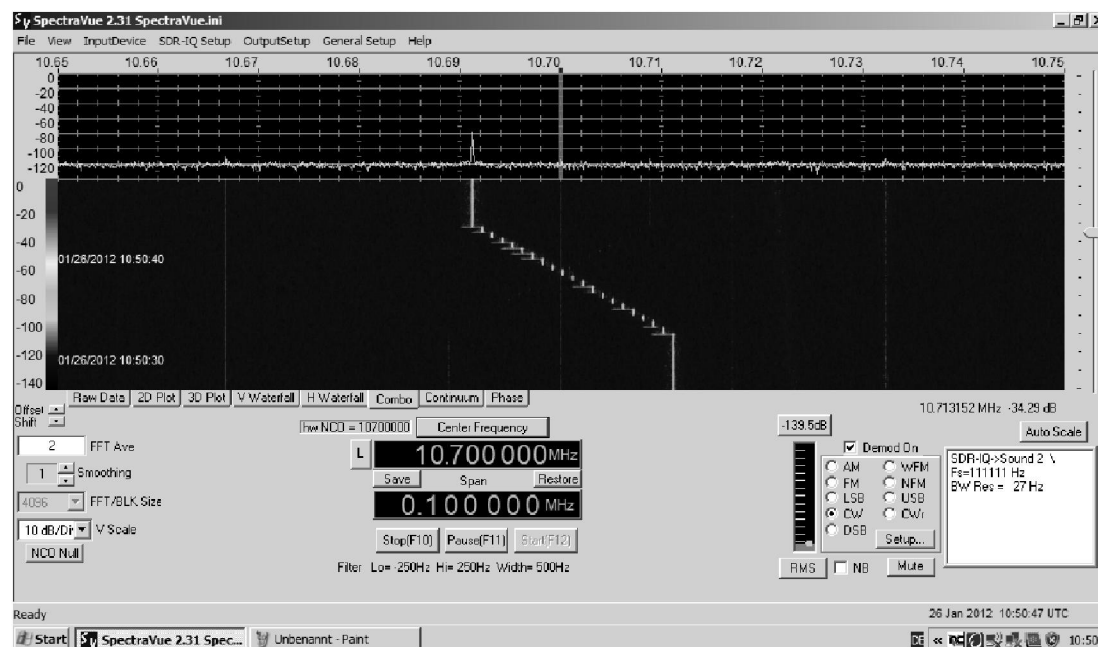
17

CALLISTO Receiver Upgrades

☉ Narrowband IF output

☀ 100 kHz bandwidth with carrier sweep

☀ SDR-IQ with SpectraVue

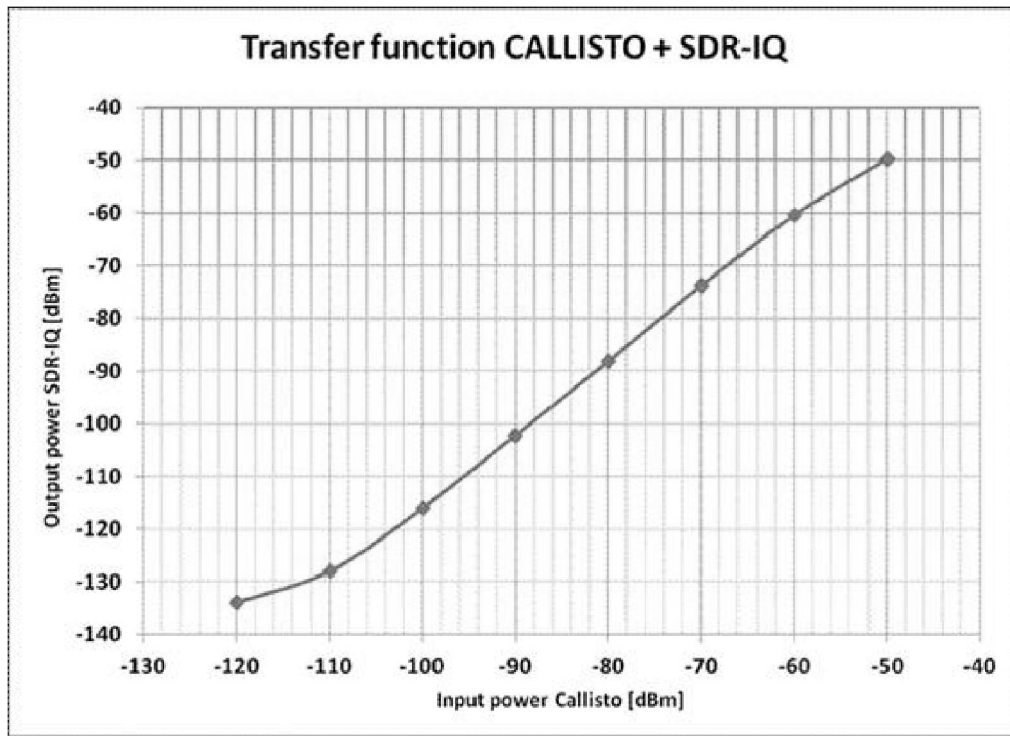


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18

CALLISTO Receiver Upgrades

◉ Narrowband IF output

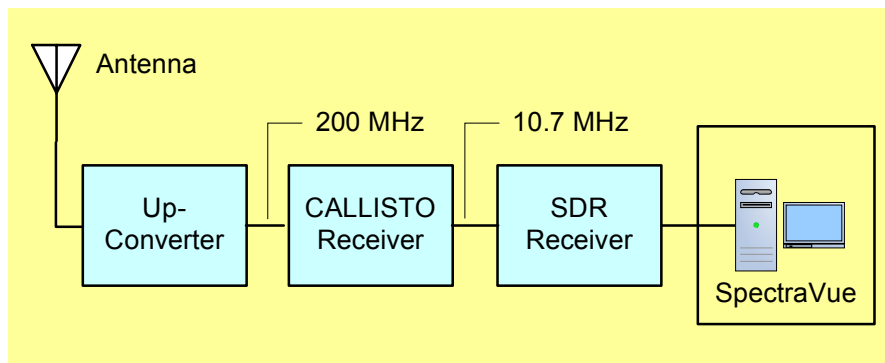
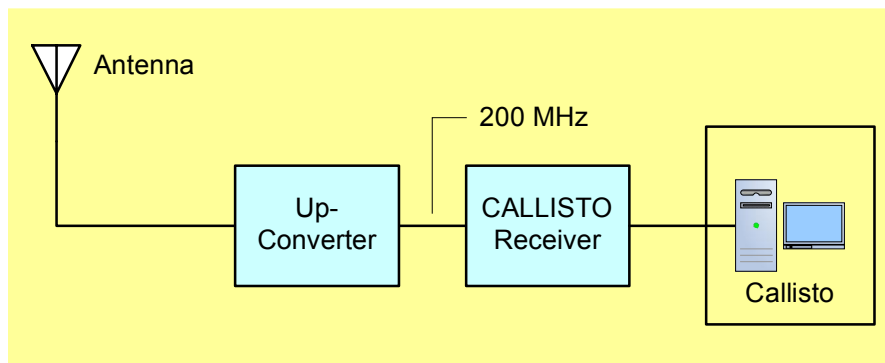


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19

CALLISTO Receiver Upgrades

◉ Up-Converter & Down-Converter



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20

CALLISTO Receiver Upgrades

◎ 20 ~ 90 MHz Up-Converter

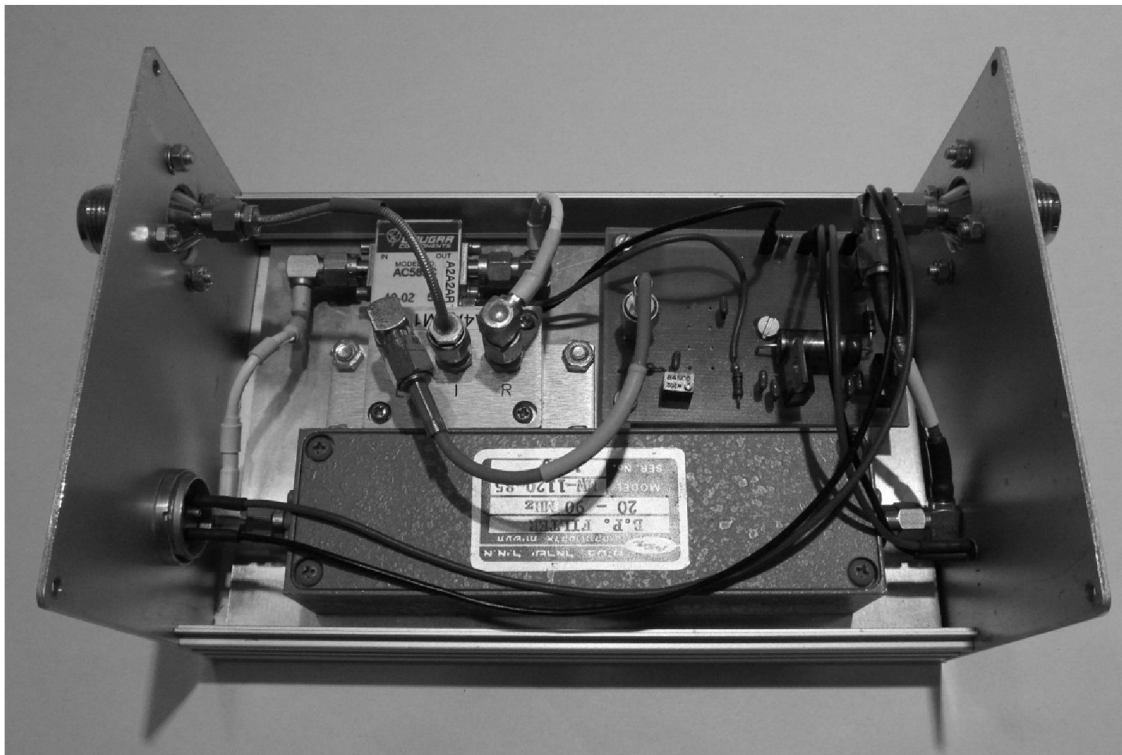


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21

CALLISTO Receiver Upgrades

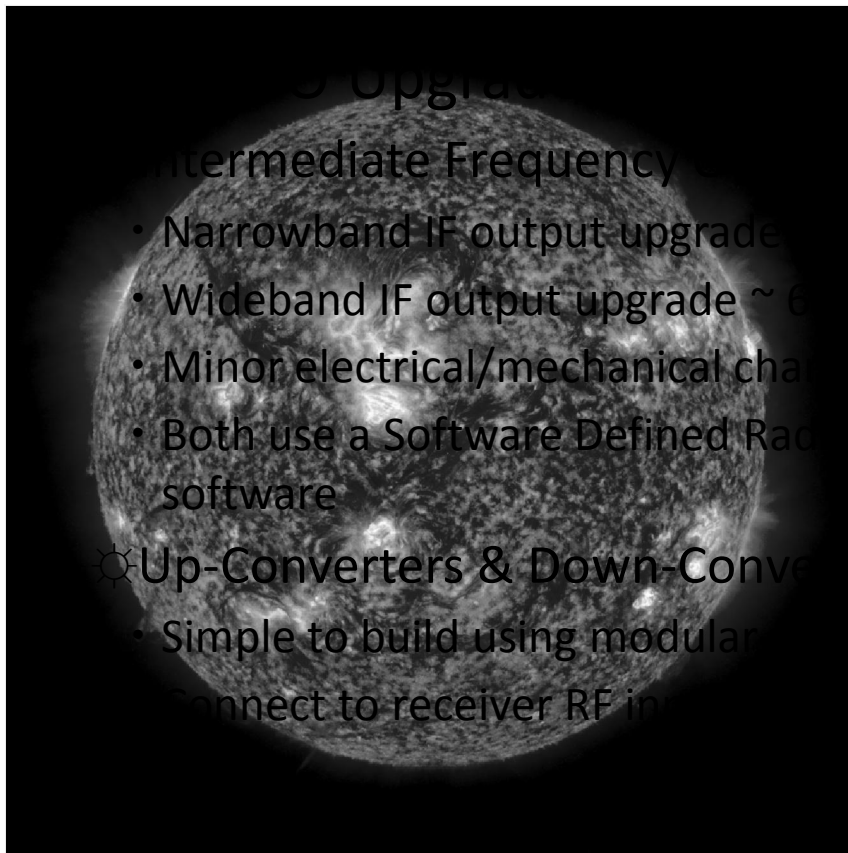
◎ Example 20 ~ 90 MHz Up-Converter



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22

Conclusions



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Intermediate Frequency Applications

- Narrowband IF output upgrade ~ 100 kHz
- Wideband IF output upgrade ~ 6 MHz
- Minor electrical/mechanical changes to existing receiver
- Both use a Software Defined Radio receiver and associated software

Up-Converters & Down-Converters

- Simple to build using modular blocks
- Connect to receiver RF input

